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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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EXAMINER

FERNANDEZ, K

ART UNIT

PAPER NUMBER

2881

DATE MAILED:

12/20/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/629,022

Applicant(s)

DO ET AL.

Examiner

Kalimah Fernandez

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☒ Claim(s) 5-8 and 24-27 is/are objected to.
- 8) ☐ Claims ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Apparatus for measuring features of a semiconductor device.

Claim Objections

2. Claims 5-8 and 24-27 objected to because of the following informalities: claims 5 and 24 are dependent on claims 1 and 20, which discloses only one support, the phrase "one of the support" implies more than one claimed support. This phrase may cause confusion and may be misleading. Claims 6-8 and 25-27 are objected to as being dependent on claims 5 and 24. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 1-11 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The phrase "first and second depths" describes a mechanism of providing simultaneous irradiation with a beam of different foci, wherein applicant's

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disclosure does not disclose such a mechanism. Furthermore, it is not obvious to one skilled in the art how to achieve such an effect. Therefore, said claim does ^{not} enable one skilled in the art to carry out such an operation.

5. Claims 2-11 are rejected due to their dependency.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-4, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by US pat. No 4600839 issued to Ichihashi et al.

8. As per claim 1, It is assumed that applicant intends to claim an invention with a means to irradiate a semiconductor device at one focus depth and subsequently refocus the electron beam to irradiate at a second focus depth. With this understanding, Ichihashi discloses an apparatus for the inspection of semiconductor devices having a electron source with focusing means and a movable sample support (col. 2-3, lines 64-5).

9. As per claims 2-3, Ichihashi discloses a support movable in a transversal direction relative to the electron beam along the axis of the electron beam (col. 3, lines 1-4; see figure 2). Ichihashi discloses the usage of at least two detectors (col.3, lines 8-

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10) as in claim 4. Ichihashi describe an arrangement, in which said detectors are spaced apart from the support (see figure 2 of reference).

10. Claim 11 is rejected as being anticipated, because of inherency. Namely, a typical scanning electron microscope has the capability to re-focus said electron beam. If the apparatus employs focusing means, then it stands to reason that the beam can be re-focused as many times as deemed necessary.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichihashi as applied to claims 1-4 above, and further in view of US Pat. No. 4447731 issued to Kuni et al. In addition to the disclosure of Ichihashi discussed above, Ichihashi describes the acquisition and processing of the detection signal generated from the sample (col.3, lines 15-21). Also, Ichihashi teaches the conversion of the detection signals (e.g. electrical pulses) into position information (col. 3, lines 42-50). Furthermore, Ichihashi teaches the capability of displaying this position information on a display device or monitor (col.3, lines 46-49; see figure 2 and 4a-f of reference).

13. Ichihashi does not teach a third detector used to detect the movement of the support. However, Kuni teaches an apparatus with optical components, which include a

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light source and detector, used to monitor the movement of the support (col.2-col.3, lines 49-5; see figure 1 and 3 of Kuni). Although, Kuni does not teach: a memory device as in claim 6 or a printing device as in claim 8; these elements have no criticality to one skilled in the art. Moreover, the graphically display of voltage vs. support position is of no critical nature to one skilled in the art; since the representation as taught by Ichihashi is essentially the same data. Furthermore, Ichihashi teaches the acquisition and processing of voltage vs. position data and provides a printed representation of said data in figures 4a-f. Therefore, it is held that claims 6-8 do not demonstrate any criticality to one skilled in the art. The motivation for these features flows^{from} the teachings of Ichihashi and the common knowledge of one skilled in the art.

14. Claims 9-10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichihashi et al. as applied to claim 1 above, and further in view of US Pat No. 5006795 issued to Yoshizawa et al. Ichihashi does not teach two sources of electrons spaced apart. However, Yoshizawa teaches two sources of electrons spaced apart, each having separate and definite focusing means (col.3, lines 34-45). Further, Yoshizawa teaches the capability for each electron beam to have different foci (col.5, lines 3-9). Specifically, Yoshizawa discloses the ability to accelerate or energize each electron beam separately. To one skilled in the art the term focus in relation to electron beams means the acceleration of the electron, Namely, a more energetic beam will penetrate the sample deeper than an electron with less energy. Therefore, Yoshizawa's disclosure teaches this specific limitation.

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15. Furthermore, the advantage of utilizing two sources of electrons is expressed in Yoshizawa (col.1, lines 67-68). Namely, Yoshizawa's invention aims to provide an accurate measurement of the size and characteristics of a semiconductor device. The modification of Ichihashi as in claim 9 by the addition of another electron source is obvious and can be motivated by the explicit purpose of Yoshizawa. One skilled in the art with this available common knowledge could clearly reason the claimed invention as defined by claim 9.

16. As per 10, Figure 2 of Yoshizawa illustrates the usage of a port or aperture positioned between the source and the focusing devices of each electron source respectively.

17. Claims 12-19 are the combinations of claims 9 with 10 along with the elements of claims 2-8, which are previously discussed and rejected.

18. As per claim 20, it is a variation of claim 9. Namely, claim 9 is dependent on claim 1, which specifies the limitation of a movable support relative to said source. In light of applicant's disclosure (i.e. figure 6), the electron sources are fixed adjacent to one another; therefore if the support is movable relative to one source it is also movable relative to the other.

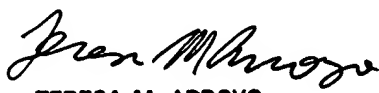
19. As per claims 21-27 are pertaining to the elements of claims 2-8 and are likewise rejected. For specifics refer to the discussion on claims 2-8.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references are cited to illustrate the state of the art and to further demonstrate that the invention as defined by claims 1-27 is highly anticipatable: US Pat No. 5892224 and US Pat No. 5430292 as per the usage of multiple electron beam; US Pat No. 5986263 as to the usage of an optical system to monitor stage movement; and US Pat No. 5097127 as to the usage of multiple detectors. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kalimah Fernandez whose telephone number is 703-305-6310. The examiner can normally be reached on 7:00am-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Teresa Arroyo can be reached on 703-308-4782. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and after Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.


TERESA M. ARROYO
SUPERVISORY PATENT EXAMINER
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kf
December 18, 2000